

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



# THE AGRICULTURAL STUDENT.

VOL. V. OHIO STATE UNIVERSITY, COLUMBUS, MARCH, 1899. No. 7.

## TERMS OF SUBSCRIPTION:

|                |   |   |   |   |        |
|----------------|---|---|---|---|--------|
| One Year,      | - | - | - | - | \$ .50 |
| One-half Year, | - | - | - | - | .30    |
| Single Copies, | - | - | - | - | .05    |

*While this magazine is published with the approval of the President of the University and the officers of the College of Agriculture and Domestic Science, the editors are responsible for the statements in all unsigned articles.*

*Address all communications to the Business Manager, Agricultural Student, Columbus, Ohio.*

*Entered at the Post-office, Columbus, O., as second class matter.*

## PUBLISHED MONTHLY BY

## THE AGRICULTURAL STUDENT PUBLISHING COMPANY.

|                     |   |   |   |   |                   |
|---------------------|---|---|---|---|-------------------|
| JOHN F. CUNNINGHAM, | - | - | - | - | Editor.           |
| W. D. GIBBS,        | - | - | - | - | Business Manager. |

## STAFF.

|                 |                |
|-----------------|----------------|
| F. S. JOHNSTON. | C. B. STEWART. |
| M. IMES.        | L. C. WARDEN.  |
| V. H. DAVIS.    | C. L. SHUCK.   |
|                 | C. W. EDDY.    |

## EDITORIAL ETCHINGS.

We hope that our readers will be patient with us concerning the slight delay in getting out the last two numbers of the Agricultural Student. The lateness in the February number was caused principally by delay after the matter had been placed in the hands of the printer. The delay this month is caused by the tardiness of certain individuals whom the editor had obliged by kindly allowing them the use of certain manuscripts before he needed them, and who seemed to forget their obligation as soon as possession of the aforesaid MSS. was obtained. The proof of a rumor is seeing it verified.

The Board of Control of the Agricultural Student Union of Ohio has decided to begin an expansion epoch this year. Formerly the only two departments operated or supposed to operate were the departments of agriculture and horticulture.

The coming year it is the intention to expand, or attempt to expand, the working departments of the Union into five departments, as follows Agriculture, Horticulture,

Dairying, Apiculture and Soils. Not all of these departments will be actually experimental in nature to begin with, but there is much to be learned concerning these different lines in the State of Ohio.

For instance, in the last three mentioned departments, dairying, apiculture and soils, the facts to be gleaned would probably be purely statistical for a few years, or until the exact condition of these industries could be more specifically determined. In the department which has been termed "soils," it is the intention of the Board of Control to incorporate at present a study not so much of soils in detail as of land, topography and cognate subjects. The effect of certain soils on certain crops, a more or less phenological study, will also be included by this department.

While the Board of Control in making these advances sees plainly that it is quite easy to attempt too much, it is believed that several lines of work will offer opportunity to a larger number of investigators. In the start, the larger the number interested, of course, the larger will be the aggregate results. In this little beginning will lie the germ of whatever success the Union is to attain in the future.

The Secretary of Agriculture has lately issued a special report on the market for American horses in foreign countries. This report is of great interest to farmers and horses breeders, as it concerns one of the most important parts, if not the leading branch, of their business—the foreign market.

The report is illustrated with good plates, showing types of tram, van and carriage horses. The foreign market for American horses as it exists today is only about five years old, but in that time it has taken wonderful strides. Its beginning was probably laid during the World's Columbian Exposition of 1893, and since that time Chicago has been the foremost shipping point.

The idea seems to be general that the horses of Europe are exactly compliant to a set ideal; that they conform as a class to an exact scale of points. But we learn from those who should know that inferior horses are produced in Europe as well as in America, and that a good animal will always bring his price. This is true in the American market, for horses, as well as for everything else. A good article never fails to find a buyer. Let us strive to produce a quality of stock and produce of all kinds that can without reserve be marked A1.

Having produced a fine article, there is another danger that should be guarded against, especially in live stock. This point is referred to in the letter of transmittal of the above report when it makes the following statement: "It is of paramount importance that no diseased animals should by any chance be landed in foreign ports from these shores. Under the present law the authority to inspect horses for export is vested in this department,

and the chief of the Bureau of Animal Industry has already taken the necessary steps to establish a proper system of inspection. Not only is this precaution due to the foreign buyers, who seek to enlarge their trade relations with us, but it is also due to our reputation. In these days, moreover, when producers in many countries seem actuated by a determination to obstruct by every means available to them the imports into their own country of American products, it becomes an absolute necessity for us, if we are to successfully develop an export trade for any of our products, to be prepared any of our products, to be prepared to guarantee their wholesomeness, soundness and perfect freedom from every sort of contagion."

This statement certainly expresses sentiment of the highest character, and as the honorable Secretary of Agriculture infers, by adopting such a trade creed the farmers and stock breeders of the country will insure a constant, lasting and solid market for their products.

---

The present issue contains an article by a practical pedagogue upon the betterment of the public school system of the rural districts. In the *Indiana Farmer* of the 11th of February we notice an article upon "Agriculture in the Public Schools," and it is readily noticeable that the authors are of opposite opinions in regard to the subject of instructing the youth in the principles of agriculture and giving him an insight into nature and her beauties. While both seem to be of the opinion that agriculture in the common schools would not be practicable under the present arrangement, the one seems to favor the idea, and consider it as good, while the other will not tolerate a thought of it.



The writer in the *Indiana Farmer* says: "The common school is not the place to teach your child a profession, or even an education for the thing itself, but a place to develop mind force while the body is developing, and thus grow into the soul of the child. . . Aspirations of patriotism and love, . . and with all a love for good books." We must say that we hardly think the gentleman exactly understands what is meant by teaching agriculture in the common schools. As the lawyer does not begin reading his *Blackstone* in the primary schools, so the idea is not to plunge the child directly into the intricacies of the science of agriculture, thus (as the writer in the *Indiana Farmer* quaintly says) "ruining the child's mind, dwarfing his soul, and making him a prey for the evil one," but it is in the elements of the subject, in the first step in nature study, that the youth is to be gently started. It is to teach him to see what he beholds, and to know and understand what he looks at daily that nature study aims at achieving.

This writer then goes on to say that "It is not agriculture or horticulture that the farmer's boy or girl hankers after, but city culture." Perhaps, if they knew the beauties with which nature has surrounded them and better understood things which they see daily, they would be better satisfied with the country and be content to let "city culture" alone.

---

The February issue contained some editorial mention of the condition of affairs in China. Since that time a letter from W. P. Bentley, a graduate in agriculture of the State University, shows what was intimated in the above mentioned editorial to be indeed true. Some time

ago Professor Wm. R. Lazenby received a letter from Mr. Bentley asking if two men from the University could be furnished to start a large commercial farm in China, upon American methods. The letter just received says that the plan has been changed, and that instead of a large commercial farm, the institution is to be in the nature of an agricultural college, which shall have at its command a farm of several hundred acres. This institution is to be under the control and protection of the government, and is to accommodate 100 students at a time, 25 going out, and 25 coming in each year. There will probably be an American president, who will possibly be Mr. Bentley, and two other Americans, one a professor of science, and the other in charge of the farming operations proper. The plan followed will probably be much the same as that followed by the Japanese universities, and native teachers will be worked in as soon as possible. The Chinese nation is waking up. The gates of prejudice are gradually opening and western civilization and ideas are entering.

---

#### Student Contests.

It is easily seen that the technical schools and colleges are getting into closer touch with the world of trade each year. This greater nearness of each to the other is not due entirely to the efforts of the institutions of learning, but is due in a large part to the public spirit and generosity of business men and firms.

The College of Agriculture and Domestic Science of the Ohio State University has been especially favored in this way by such liberal firms as W. B. Smith & Son, of Columbus, O., cattle breeders, and D. M. Osborne & Co., farm machinery

manufacturers, of Auburn, N. Y. The latter firm last year offered a prize of either a corn harvester or a self-binder to the writer of the best essay upon the subject, "The Cultivation and Harvesting of Indian Corn." It might be well to say at this time that D. M. Osborne, president of the above named company, is deeply interested in that great cereal crop, the Indian corn, and this is one of the ways in which he shows his interest.

When this contest was suggested several students of the Ohio State University avowed their intention of entering it, and Mr. V. H. Davis, of whom a likeness is given here-with, was awarded first place.

The essays were submitted for his decision to Dr. I. P. Roberts, dean of the College of Agriculture at Cornell university.

#### Vernon H. Davis,

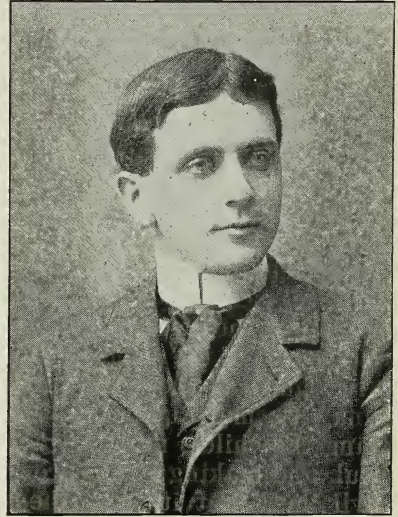
Winner of the Osborne Essay Contest.

Vernon Hayes Davis was born on the third day of March, 1877, in Jackson township, Guernsey County, Ohio. After spending his early days upon the farm and receiving the usual district school education, he entered the short course in agriculture at the Ohio State University in the fall of 1895. Since that time he has attended the University, having entered the long course in agriculture after completing the short course.

Mr. Davis' ability has been appreciated by the students of the University, as is shown by the many positions of trust to which he has been elected by them. Among these might be mentioned treasurer of the Y. M. C. A. building fund, and secretary, treasurer, vice president, critic and historian of Townshend Literary Society. He belongs to the class of

1900, and is a member of Alpha Zeta fraternity.

Mr. Davis is not new to essay work. Among other ventures in



this line might be mentioned his essay on "Fifty Years' Growth of Wheat at Rothamsted, England," which tied for first place in a contest, and appeared in the "Ohio Farmer" of July 26, 1898.

As a student Mr. Davis is of the first quality, leading his classes. He is a young man of unusual promise, being of the most exemplary habits, affable in manner, of good address, and commanding, by his presence, the respect of his fellows.

#### PROGRAM

Of the Fifth Annual Convention of the Ohio State  
Dairymen's Association, Held February  
14 and 15, 1899, at Townshend  
Hall, O. S. U., Columbus,  
Ohio.

TUESDAY, FEB. 14.

9 o'clock A. M.

Address of Welcome. . . . President  
James H. Canfield, Ohio State  
University.



Response and President's Address..  
 ..J. Fremont Hickman, Ohio  
 Agricultural Experiment Station,  
 Wooster, O.

Practical Butter Making on the  
 Farm....Mrs. M. S. King, New-  
 ark, O.

Method of Preparation, Use and  
 Results of Starter...D. A. Crow-  
 ner, Dellhurst Farm, Mentor, O.  
 Appointment of Committees and  
 Miscellaneous Business.

1 o'clock P. M.

Address.....Major H. E. Alvord,  
 Chief of Dairy Division, U. S. De-  
 partment of Agriculture.

The Best Kind of Cheese for the  
 Ohio Cheesemaker....B. B. Her-  
 rick, Wellington, O.

The Rennet and Curs Test Prac-  
 tically Demonstrated....Prof. H.  
 H. J. Noyes, Ohio Dairy School.

7:30 o'clock P. M.

Bacteria in the Dairy, Creamery  
 and Cheese Factory....Dr. A. M.  
 Bleile, Department of Physiology,  
 Ohio State University.

Address.....Major H. E. Alvord

WEDNESDAY, FEB. 15.

9 o'clock A. M.

Scoring Dairy Cattle Practically  
 Demonstrated in Livestock Lec-  
 ture Room.....Prof. Thomas F.  
 Hunt, Department of Agriculture,  
 Ohio State University.

Feeding Cows for Milk Test..E. F.  
 Smith, Firm of W. B. Smith &  
 Son, Columbus, O.  
 Discussion opened by C. W. Horr,  
 Wellington, O.

The Prevention and Treatment of  
 Injury and Diseases of the Ud-  
 der....Dr. D. S. White, College  
 of Veterinary Medicines, Ohio  
 State University.

Dairy Stables....George E. Scott,  
 Mt. Pleasant, Ohio.

1 o'clock P. M.

Collecting, Care and Distribution  
 of Milk....French, of French  
 Bros., Cincinnati, O. Discussion  
 opened by Harmon Austin, War-  
 ren, O.

Which is Best for Ohio, the Whole  
 Milk or Gathered Cream Sys-  
 tem?.....J. T. Bentley, Circle-  
 ville, O.

What Can This Association Do to  
 Advance the Dairy Interests of  
 Ohio?.....Leon D. Smith, Man-  
 tua, O.

Three Weeks' Observation Among  
 Fancy Dairies of the East...Mr.  
 May Harmon, Sup't of J. T. Polk's  
 Dairy, Greenwood, Ind.

Report of Committees.

#### Annual Report of O. S. U. Dairy.

The past year has seen many very  
 valuable improvements made in the  
 system of handling the milk from  
 the O. S. U. dairy herd. In place of  
 the old system of hauling the milk  
 around over the city in cans and  
 drawing the customer his or her  
 portion in an open tin cup while a  
 brisk wind is driving the fine, dust-  
 like filth of the city streets into the  
 wagon and over the cans and uten-  
 sils, where it lodges on all moist sur-  
 faces and is finally handed out to a  
 confiding public, the milk is now  
 separated, pasteurized, standardized  
 and bottled, and each bottle of milk  
 labeled with the O. S. U. guarantee  
 as to its purity and quality. By this  
 system the milk is placed in the  
 hands of our patrons in a perfectly  
 pure and absolutely uniform quality  
 throughout the year. Of course,  
 this work necessarily added very  
 much to the expense connected with  
 the handling of the milk. This very  
 great improvement has already re-  
 sulted in such an increase of trade  
 that the dairy herd was soon in-

creased to its fullest capacity. The average number of cows in milk during the year was 36. These 36 cows produced 219,558 pounds of milk, testing 4.3 per cent. of butter fat. This gives us a total of 9,440.99 pounds of butter fat. There was sold during the year 165,620 pounds of milk, or a total of 7,055.7 pounds of butter fat. The cash receipts during the year were \$4,006.87, or 56.7 cents per pound for our butter fat.

Now, as to the cost of this milk. It took \$1,279.96 for feed, \$200 of which was for pasture. The labor cost a total of \$2,149.64. Of this sum \$447.41 was expended in the laboratory, where the milk is bottled and prepared for delivery. It cost \$455.84 to deliver this milk after it was produced. The total cost of feed and labor was \$3,429.60; thus leaving a net gain of \$576.77. The receipts per cow were \$111.30, and the cost per cow was \$95.26, leaving a net gain per cow of \$16.04.

Of the \$2,149.64 paid out for labor every cent of this was paid for student labor. Thus, while the dairy is a source of profit to the University, it also furnishes substantial aid to those students who wish to pay their way through school by working at odd hours.

C. B. S.

#### Cost of an Ohio Corn Crop.

We take the following from the American Agriculturist of Feb. 25:

Two years ago when American Agriculturist published the results of records kept on 2,632 acres of corn, showing that the average cash expenditure in its production, including taxes, all labor actually given the crop, board of labor and team maintenance, but not including rent or interest, was 6 cents per bushel, criticism of the conclusion was especially severe in an Ohio farm paper. The following data for the crop

of 1898, furnished by Mr. Frank Ruhlen, now assistant in agriculture at the Ohio State University, for a crop which he personally made, the crop being grown on private land before Mr. Ruhlen became connected with the University, will be interesting to those who insisted that our conclusion was radically wrong.

Location, Union county, Ohio. In the field 18 acres of bottom land, black loam soil, worth \$60 per acre. The price paid for labor was \$2 per day, man and team, board and feed furnished by the grower, and \$1 per day in cutting, horse furnished by grower:

|  |          |
|--|----------|
| Plowing, 7½ days at \$2....                | \$15 00  |
| Harrowing, 3 days at \$2....               | 6 00     |
| Planting, 2 days at \$2.....               | 4 00     |
| Cultivating 4 times, 7 days at \$2.....    | 14 00    |
| Cutting with harvester, 6 days at \$1..... | 6 00     |
| Husking and cribbing, by the job.....      | 45 54    |
| <hr/>                                      |          |
| Total wages ....                           | \$90 54  |
| Seed corn, 70 quarts.....                  | 1 00     |
| Taxes .....                                | 2 48     |
| Est. cost board 26½ days....               | 7 95     |
| Est. team maintenance 26½ days .....       | 4 90     |
| <hr/>                                      |          |
| Total cost .....                           | \$106 87 |
| Value of fodder.....                       | 20 70    |
| <hr/>                                      |          |
| Net cost .....                             | \$86 17  |

Total cost .....\$106 87  
Value of fodder..... 20 70

Net cost .....\$86 17

The field produced 1,138.5 bushels, and the net cost per acre was \$4.78, or 7.6 cents per bushel. This is very close to the result which our own tabulation of two years ago gave for Ohio, and in addition it will be noted that the labor was hired by the most expensive method, man and team per day. Mr. Ruhlen furnished the implements used, and allowing \$1 for the cost of implements and a



depreciation of  $12\frac{1}{2}$  per cent. per annum for wear and tear, his net cash outlay on the crop would be at the rate of 8.7 cents per bushel. The rate of yield was  $63\frac{1}{4}$  bushels per acre. This is about double the average for the state. So it will further appear that these results are in line with our final statement that corn could not be grown to sell at less than 18 cents without loss.

### Centralization of District Schools.

I hardly feel capable of writing on this subject, which has been so ably and thoroughly discussed by so many prominent speakers and writers; but in giving my thoughts on this, to me, most important subject, I only wish to do my part to "keep the ball a-rolling," in hope that it will finally become large enough that all may see it, and see it clearly.

When we have under discussion the adoption of some new plan or system to take the place of one which has been thoroughly tried and is well established, we should ask ourselves these questions: First, is the present system defective, and how? and second, will the proposed plan do away with these defects?

Let us apply these questions to the topics under discussion. Is our present district school system defective? No rational person would answer this question negatively. But how? To me the greatest defect is the necessarily small amount of time that can be given to each recitation. This defect exists in every district to a greater or less extent according to the number and age of pupils. No teacher can do justice to a class that must be heard in from five to fifteen minutes, and that is all the time that can be given to classes in any ordinary district school.

The next defect in importance, perhaps, is brought about by the

change of teachers. This defect is much more prevalent in some districts than in others. Where it is practiced, while in some ways it may be a benefit, yet the bad effects far outnumber the good.

No two teachers instruct alike, and when the pupils have to become accustomed to two, or even three, teachers each year, they can not do justice to their studies.

Another defect is the lack of power on the part of the teacher to make a pupil take such studies as he most needs and to place and keep him in the class which best suits his age, ability and advancement. Under the present system in many places the pupils can take such studies as they or their parents wish, and drop those they do not desire to take, and the teacher is utterly powerless, except so far as his persuasive ability goes, and that is not very far with the ordinary school boy or girl.

Another defect which is quite a grievous one in some places is the interference of parents with the teacher. In an ungraded school, if a pupil is held back or some advanced above others, the parents are quite sure to accuse the teacher of partiality; and quite often the parents uphold their children when they disobey the teacher. These interferences weaken the teacher's influence and often do great harm. There are other defects which might be mentioned, but these seem to me to be the most prominent.

Now, let us endeavor to answer the question as to whether the proposed system will do away with these defects or not.

First, as to time that can be devoted to class recitations. Here we certainly would have a great improvement, as in a graded school, as all centralized schools would be, at least double the time, and in some

cases more, could be devoted to recitations.

In reference to change of teachers, we can clearly see that this difficulty would be almost entirely overcome.

Also in the graded school the pupils would have regular class work and studies, and their place or class would be determined by their own grades; and thus the teacher would be relieved to a great extent from the accusations of partiality, and the unjust interference of parents would be much lessened, at least it could and would not have as bad an effect on the pupils or teacher.

Besides the overcoming, to a greater or less extent, of these defects, there would be the addition of several good features. First, perhaps, the social feature, the presence of larger numbers in the classes would bring about a healthy competition, which would spur many on to better work. Then the advantages of better equipment, more material for demonstration, and time to use it, would create much more interest.

The greatest advantage would be for those who would desire to take up studies which are not and can not be taught in the district schools at present.

We have known for some time that a pupil's mind can be developed on branches which apply directly to his chosen occupation as well as on those which do not apply directly to his work. Many have been advocating the teaching of elementary agriculture and its allied branches in the district schools. I do not believe that this can be successfully done under the present system. There are two principal reasons why it can not be done: First, because of the lack of time to hear the recitations, and, second, because the majority of district school teachers are not qualified to teach these branches. While,

with the plan of centralization in practice, these difficulties would be overcome to a great extent, especially the one as to teachers, as one teacher in each school could be secured who would be qualified to teach such branches. In the introduction of such studies as botany, zoology and chemistry, and those branches which pertain only to agriculture, I believe a great evolution in general education or the education of the masses would be brought about. Boys who shun grammar and history, and at an early age perhaps leave school entirely, could be held and would be attracted by these studies, if taught in an attractive manner. Many of the girls who now go to school more for fun, or because they are obliged to, would be glad to go and to study the flowers and every-day things, which they so much admire, but seldom know anything more about.

Many theories are advanced which, when brought to the real test are not found practical. I believe this is not one of that kind; first, because where it has been tried it has proven very successful, and, second, the arguments which can be brought forth are so much in its favor that the advisability of adopting it seems very sure.

"It would cost more" has been argued against it. I cannot see, when once established and the school houses erected, how it can cost much more, but even if it does, the gain would by far exceed the extra expense. We can not expect to have anything worth having without making the necessary effort. "It will throw many teachers out of employment" is another argument advanced against it. In reply to this we only have to ask the question, "What are schools for, the teachers or the pupils?"



Another good feature of this system, which is not directly connected with the school work, but which may be associated with it to a great advantage, is the adoption of the "Rural Free Mail Delivery," where this system is put in practice. This has been tried and has proven very satisfactory. Can we expect its general adoption? I believe we can. I also think that the time when its general adoption is made depends largely upon those directly interested in higher education.

The students and graduates in the courses in agriculture and horticulture at the university can have a marked influence, coming from all parts of the state, as we do, and with the number that we are. When such an important issue as this comes before us, let us make good use of our ears, tongues and pens, and do what good we can with the powers we possess.

C. W. WAID.

*Morenci, Mich.*

### Feeding Cows for Milk Test.

At the last meeting of the Ohio State Dairymen's association a very able paper upon the above subject was read by Mr. Eldon F. Smith, of Columbus, O. We regret that lack of space prevents the publication of the entire paper, but the following composed part of the production:

He said that the modern dairy cow was a product of education. To get her ready for the tests she was taken about two months before calving and gotten in the pink of condition by extra care and feeding. She should be given salts in order to avoid constipation. After calving she should be given all the warm water she wants to drink and be fed bran, oil meal, some green food, beets, cabbage, ensilage.

As soon as the inflammation is out of the udder grain may be fed. Then the test may be made. As to the time to make the test probably the ideal

time is from February 1 to April 15. This test should not be made during the late summer and fall. Feed depends upon the season of the year, but in starting a cow for the test we feed: Bran, 1 pound; malt sprouts, 1 pound; gluten feed, 1 pound; corn meal,  $1\frac{1}{2}$  pounds; oil meal,  $1\frac{3}{4}$  pounds; cut clover hay, 2 pounds. This is one meal. Some cows we give more than this and some less. The amount consumed depends upon the cow and her capacity for digestion. We have never been able to get over 30 pounds of grain into one cow per day, usually 24 to 28 pounds. The power to consume and digest can be developed in a cow to a wonderful extent. A cow will not eat more than she can digest after a short time, provided it is a balanced ration. We lean to the protein side of a ration in testing a cow. If you increase the food of a cow and she decreases, instead of increases, in her production, you are feeding her more than she can digest; so cut down the feed and she will probably resume.

The official test is conducted by a representative from the Experiment Station, for whom there is no charge except his expenses. You can have this man for seven days free of charge. These tests can be relied on, for they are made by men who are intelligent, honest and interested.

The discussion of Mr. Smith's paper was opened by Mr. C. W. Horr of Wellington, O., in a very interesting paper.

In this paper Mr. Horr pleaded his inability to prepare a paper of scientific value, but before he had finished every one was convinced that he could tell us all a great deal; in fact, the paper was one of the best delivered before the association. Mr. Horr referred to the necessity of giving the rules of the test a very careful study. In feeding for the test a



great deal depended upon the length of the test. It was pointed out how the rules governing a test could be so changed as to favor or work to the disadvantage of a certain breed, while still preserving the semblance of honesty and fairness. If the butter is valued at a low price, and hay, grain, etc., consumed at a high price, then the small breeds would have the advantage, but if the by-products are valued fairly, the butter produced credited at top prices, and the feed charged on the basis of country prices, then the Holsteins certainly have the pole.

The first thing to do is to select the cows which will serve him best. The feeder never lived who can make a good showing with a naturally ordinary cow. The ability to produce great quantities of milk and butter is inherent in the cow, and is the result of years and perhaps centuries of careful intelligent breeding and feeding. Very little should be fed, and the cow should be trained to eat and convert into good milk rich corn silage and grain.

Mr. Horr was of the opinion that the 24-hour test was not always reliable as showing the true merit of a cow or of a breed of cows. The 7-day test is far better, as the element of luck is more nearly eliminated. However, the longer the test, the more injurious to the cow.

Mr. Horr thought that while the breed tests adopted by the State Board of Agriculture were ingenious and valuable as a means of developing the dairy interests of Ohio, there ought to be some cash prize offered to induce the dairymen to send the best cows of the state for exhibition at the State Fair.

In the general discussion which followed the paper, **Professor Hunt** asked Mr. Horr if he would accustom the cow to coarse feed as a preparation for the test. Mr. Horr re-

plied that before the cow came in she should be fed hay.

Mr. Devol asked if it would be advisable to feed oil meal before calving. The bulk of the opinions expressed in the discussion which followed seemed to be in favor of increasing the roughage and lowering the concentrates.

Mr. Condit of Condit, O., then asked Professor Hunt for the comparative value of gluten feed and bran. Professor Hunt replied that there was about 1,200 pounds of digestible matter in a ton of bran and about 1,700 pounds of digestible matter in a ton of gluten feed. The gluten feed narrows the ration, and as the bran was high in phosphoric acid and ash, he had never felt quite safe to let it go.

It was further brought out that gluten feeds in excess tended to throw the cow off her feed, but that you could feed all the bran you wished without danger of this.

---

### Horticulture from a Commercial Standpoint.

(L. K. Sutton Before the Columbus Horticultural Society.)

The business of growing fruits and vegetables for commercial purposes is constantly changing and the field for operating widening.

Education comes first in the fruit line. We have no trouble in trading with the educated grower, but it is different with the uneducated. The grower who reads, studies and travels knows how to grow, gather, prepare and ship his fruits. If ready to sell, always has a price; is not excited if a dealer calls to purchase a portion or all of his crop. The successful fruit grower subscribes for and has time to read some of the leading journals in his line; studies the situation, does not rush in and plant all the new varieties simply because some fluent agent with colored

plates calls and tries to persuade him that he can grow on his soil and produce as high colored fruit as shown in the catalogue.

Columbus is our home, and we will tarry here a few moments. Our city is a consuming city in nearly all lines; very seldom enough fruits or even vegetables are raised here to supply home demands. Our horticulturists and gardeners are a little slow. Our dealers must depend largely on Cincinnati and Toledo for their cucumbers and radishes; bad management here. Last summer our market drew on Cincinnati for as many as eighty barrels of radishes per week, during the height of the season. Now, if money for the gardner there, why not money for our home gardeners—not counting express charges and packages.

We could help supply Cleveland, Pittsburg and smaller northern Ohio towns, if only our gardeners would grow them. The same can be said of nutmeg melons; no soil produces finer flavored (excepting Colorado), and as for tomatoes, we stand at the head. Nearly all the leading varieties were originated by the late A. W. Livingston of our city. A canning factory is needed here. We have the soil; can grow the goods; cheap labor, railroad facilities and plenty of capital. Only one thing is needed, co-operation. The demand for canned corn and tomatoes is increasing every year, also for pickles, and the margins have been quite large the past three seasons. A good opening here for a live firm.

There is no use denying the fact that all branches of farming or fruit growing have suffered during the past three years. Now, how to overcome it or improve is the question. I am acquainted with one gardner whose rule is never go to the city without taking something to sell.

That man saves money every year. Again, plant only what you can properly cultivate. Let the varieties be of such a nature as suits your soil, and pleases your customers. You should not become discouraged because your Ben Davis apples are not like those grown in Kansas in size, color and flavor, or like the Baldwins of eastern states or the Bellflower of Oregon and California. But you can raise the Red Astrachan, Maiden Blush, Grimes' Golden and Rome Beauty here by spraying every year and cultivating and enriching the ground by phosphate, lime, ashes and well-rotted manure. How can you expect to have a crop of apples if you allow your orchard to grow in sod, seldom pruning and occasionally a partial attempt at spraying. There is nothing mysterious about the success of the fruit growers of the Pacific states. In the first place they take pains to produce high grade fruit, then pack in new boxes of convenient size in the most attractive manner, and when you please a buyer's eye, the sale is half made. Wrap your fruit, if necessary; pack honestly. If it pays California growers to buy colored paper in which to wrap their fruit it will pay you, and the freight is saved. Try a box on the market and see.

We have never had too many choice strawberries, nor apples, peaches or pears. Our market is often glutted with overripe fruit and inferior quality. Prices are low some days, of course, but we can not control the weather, nor people's appetite. The good fruit is always quickly taken. It costs more to pick a quart of small, soft berries than a quart of nice large ones. Don't overplant, but try for size every time. What is the use of sending north, south or east every spring for new varieties of plants at a high price.



You have the soil and time; why not originate some new varieties yourself and sell some. Keep your money at home, and get a little of somebody else's. If it pays them, it will pay you; try it. Organizations, clubs, associations, are good in their place, but they are becoming "a fad" in all lines, and if this craze is kept up the ordinary man will be kept busy attending meetings. Individual effort is what is needed to make anything successful. Try it on the farm.

We believe the fruit grower should be governed in his planting by his nearness to market. Some varieties of fruit can be grown successfully and yield good returns if hauled to market in a wagon, and sold the same day as picked, while the same fruit if compelled to be shipped by express a long distance to find a market are almost valueless.

#### PREPARING FRUIT FOR MARKET.

Put the best and highest colored fruit on top every time; people look for it there. You would simply be called slow if you did not. You can hold your trade and reputation if you will have your fruit as good size through the box or barrel, even if color is lacking. It's the habit of putting fine fruit on top of the package, then filling in with overripe or small and knotty fruit in balance of measure, that hurts. Put up your fruit in such a manner, with your name attached, that a customer who buys once will call again and ask for that particular brand. If your fruit is entitled to be marked 5 X, put on the X's; if only X, then so mark it; customers will respect you. Put your ripe fruit as near as possible in a crate and mark it ripe; also separate the seconds from the first, and mark them accordingly. Strawberries, apples, grapes and oranges

are in demand the year around; other fruits as a rule in their seasons.

There is a growing demand for late strawberries. Now the horticulturist who can produce a late bearing strawberry will have a demand for all his berries at good prices, and an outlet for the plants.

The recent severe weather will cause numerous changes in the plans and prospects of many fruit and vegetable growers in nearly all sections. Many peach orchards that promised a large yield in January are blighted down, and a substitute must be found to supply the demand. A dish of berries, an orange, bunch of grapes, a banana or piece of melon before breakfast is a relish and serves to sharpen one's appetite for the more substantial foods to follow; but not so with a peach. When you eat a peach there is generally a less demand for the more solid foods. Peaches seem to supply or contain bread and meat, and a crop of peaches affect the sales of meat and groceries more than any other variety of fruit. So you can readily see the effect the loss of a peach crop has on the market. It will require more berries, corn, tomatoes and potatoes to supply demand, than if the crop of peaches was safe. Stringent times, like all branches of industry, have passed through during the past three years, causes uneasiness in all lines.

In some cases profits are small, others none, and in many a loss has been incurred. Farmers want to change for something that will bring in more money and less work. Men in business in cities were trying to sell out and seek other lines for investments; nearly every one wanting to find a means of making money rapid and take life easy. The shrewd business man, whether on the farm or in the city, will take advantage of these times, and profit by



22

the mistakes of others. Fruit growing and farming will yield good returns yet. A good time to plant raspberries for those who have the soil to produce them, also, tomatoes, this season. Give a little extra cultivation to every field; try to grow such fruits and vegetables that will give you a wagon load every day when market season opens. The time will be used on half a load any how, and the careful grower will manage so as to have a full load every day. It is the constant adding that fills the purse.

#### Good Roads.

The transition from barbarous and semi-barbarous methods of life to a commercial, trading, organized civilization has always been marked by the construction of roads. In this country these roads have been chiefly railroads, and to these we owe in a great measure our rapid increase in wealth. They have penetrated wherever population has penetrated, but the limit to the profitable building of railroads has been reached in many sections of the country, and an agitation has sprung up for the improvement of the common country roads. These are needed for a double purpose; first, for the purpose of commerce, to serve as feeders to and distribute from the railroads; second, for the purpose of health and pleasure. The agitation for good roads rests on two distinct bases; business, or economy in transportation, and pleasure. The question of transportation can never be considered as satisfactorily settled so long as it costs as much to get a ton of produce to the railway station as it does to haul it 400 miles over the railroad.

The financial loss from bad roads in the United States is enormous. Gen. Roy Stone, of the Road Inquiry office, has estimated that the annual

cost of transportation over the country roads is nearly \$946,500,000, which constitutes over one-third the total value of farm products, and nearly two-thirds of which is due to bad roads. The average load in this country is from one to two tons, while in Europe it is from four to six.

There is nothing that hinders the development and advancement of the whole country, and especially the agricultural portion of it, as does the almost universally deplorable condition of our roads during a large part of the year. Some one has said that "The road is a creation of man and a type of civilized society. What a high idea of our civilization even a very short trip, over almost any of our country roads, should give us."

The lesson is being learned slowly, but surely, let us hope. Within the last 20 years great strides have been made toward general road improvement. In 1895 sixteen states had passed radical road laws, and many of them now have hundreds of miles of excellent stone roads, as an object lesson of what can be done, and what may be expected from them.

It is a fact to be regretted, however, that but comparatively few farmers, the class of people more directly benefited than any other, have taken an active part in starting such a movement, when, by the nature of their position, they should be the leaders in this reform.

Even from these few facts so briefly stated it can not help but be seen that the question of good roads is destined to be one of the most important in the rural economy of the future, as indeed it has already become. We may be able to get the maximum yield with the minimum cost from our soil, or the maximum amount of beef from the minimum amount of feed and care, but so long

as nearly one-third of the total produce must go to defray the cost of marketing that produce, we should not wonder that many farmers do not become rich.

It seems to me that here lies a good opportunity for our agricultural colleges to do a great work for the farmers, who are coming more and more to look to these colleges to take the initiative steps in any improvements radically effecting agriculture. Every student in the agricultural course should have an opportunity to make himself familiar with the needs of good roads, the best methods to obtain them, and the materials available for road construction, together with some of the general details in the proper construction of modern roads. The student would then become a teacher in a practical way in whatever community his lot might be cast, and thus pave the way for rapid advance in road improvements.

In connection with this phase of the subject a statement of Major H. E. Alvord before a meeting of the National League for Good Roads may be cited as worthy of careful consideration. He says: "If the happy day should come when our public roads will be controlled and managed by competent engineers, it is a proper theme to consider this supply, which is certain to be needed, will be provided. There is no means by which competent, thoroughly educated engineers can be better secured than through the instrumentality of our agricultural colleges. They have already departments of civil engineering, physics, geology and agricultural physics, all of which bear directly on this question, and they would only have to shape and apply the instruction already given to make it directly ap-

plicable to the education of competent highway engineers." V. H. D.

### Veterinary Items.

#### SOME PHASES OF CANINE PRACTICE.

Often the practice of canine medicine forms no inconsiderable part of the city practitioner's cases, and in many ways is more satisfactory than any other part of his business. In treating a horse the only question in the mind of the owner is whether the animal can be restored to usefulness at a less cost than to replace it with a sound animal. Thus the veterinarian is often tempted, and often does treat cases that prove a financial loss to himself and unsatisfactory to the owner. This is rarely the case with a dog, which, in the city at least, is always a pet or the playmate of children, and the owners are willing to incur any expense to restore the animal to health or prolong its life. Of course, all cases treated here at the hospital are treated at a merely nominal figure, but with the practitioner it is different. His best fees are derived from the wealthy owner of pampered dogs who have recovered oftentimes from the most trivial dispositions. Many of the cases brought here to the hospital need only a restricted diet to correct some slight digestive disturbance caused by overfeeding on the part of the owner. Others are suffering from some skin disease which yields readily to treatment. Of course, many cases are serious and terminate unfavorably, but in the majority of cases we are able to effect a cure. Surgical operations on dogs are rarely fatal, and are performed with impunity. A dog is easily narcotized with morphine and never succumbs to its effects, rendering the operation comparatively easy to both patient and operator. In pathological cases the animal can be easily induced to take medicines,



and can be given the best of hygienic surroundings, which is by no means the case in equine patients, unless they can be brought to the hospital. A dog is a much more manageable patient than a horse, but even if he is inclined to resist treatment his objections are easily overcome. We have treated a number of cases of fractured legs, and in no case has the animal offered the least resistance to the limb being set and splints applied. They soon learn to run about on three legs and become reconciled to the plaster cast, and perfect recovery ensues. The fractured limb unites in about four weeks, and in two months no traces of the injury are left. One or two of our cases have been a little out of the ordinary and deserve mention. Last May a large mongrel dog was brought in with both front paws badly fractured and mangled. The owner said the animal had been knocked down and injured in this manner in Worthington by the street car. He had hitched up immediately and driven in as fast as possible. After a thorough examination of the dog it was seen that amputation of both fore feet would be necessary, and destruction of the animal was advised. The owner would not consent to this, saying that the dog had been of great service to him in the past in driving cattle, and although he was getting old, he wanted everything possible done to alleviate his suffering and prolong his life. Accordingly the dog was narcotized with morphine and both fore paws amputated, one at the joint, the other a little above. The legs were bandaged, all large arteries having been ligatured to prevent bleeding, and the dog tenderly placed in the bed of straw in the wagon box and driven away. We heard nothing of the case until recently a neighbor of the owner

brought a horse to us for treatment. On inquiry, we learned that the dog was still living, that he had recovered from the amputation in a month or so, and had soon learned to walk about on the stumps. Although not able to drive cattle as of old, he still manages to hobble out to the road and bark at passing teams. An attempt to supply him with artificial limbs by his tender-hearted owner had not been a success.

The second case was discharged only a few days ago as cured, although it seemed equally hopeless at first. On Jan. 23 a medium sized brown, mongrel dog was brought to the hospital and left for treatment. His mouth and lips were almost a solid mass of warts, his tongue was entirely covered, top, bottom and sides; they covered the roof and sides of the mouth and extended back into the pharynx as far as could be seen, threatening to eventually close the entrance to the oesophagus and cause the animal's death by starvation. The case seemed almost hopeless. The first step in treatment was to remove some of the largest warts surgically. A mild astringent was applied daily to the mouth, and the improvement was as rapid as it was unexpected. The general condition of the dog also improved rapidly, and when discharged, Feb. 7 he was in splendid condition, and almost the last trace of the warts had disappeared. In neither of these cases would the intrinsic value of the dog exceed two or three dollars, but the owners would doubtless have been willing to spend twenty-five dollars to have had the animal cured. These are by no means exceptional cases; in fact, it is the exception for the owner of a dog to consider any question of expense and every busy city practitioner will



testify that this has been his experience. The only class of dog owners who are an exception, are those who keep hunting dogs. With them, as with the owner of a horse, it is a question of how much can be gotten out of an animal and no question of sentiment influences them in treating a sick or injured dog. Truth compels us to state, however, that they exercise the most rational care of their animals, and rarely if ever bring in an animal except during the hunting season, when the treatment is for some trivial gunshot wound, or thorns, etc., to be removed from the eyes.

#### CASES FROM SELLSVILLE.

The menagerie of Sells Bros.' circus affords us during their stay in winter quarter many very interesting cases, and many very valuable specimens. The Sells Bros. have very generously given to the veterinary department all of the animals which have died during their stay in winter quarters. Most of these have been turned over to the biological department, and have been added to the collection in their museum. The value of these specimens can scarcely be overestimated, and it is not likely that any other institution in the country has the opportunity of adding to their museum such rare specimens at the mere expense of having the skins mounted. Notable among these is the hippopotamus, whose stuffed hide occupies a prominent place in the biological museum. The animal was one of a pair owned by the Sells, and was for years one of the greatest attractions of their show. They had several times refused a hundred thousand dollars for the pair, and were offered a good sum by the Smithsonian Institute for the hide of the animal after its death, which occurred about a year ago. It was apparently in perfect health a few moments before its

death, and the only thing discovered on post-mortem was a dropsy of the heart. A study of the structure of this enormous beast was very interesting, and many of its internal organs are preserved in our museum. The skull, with the large canine teeth projecting straight out from the jawbone, is a very fine specimen. Four of these canine teeth are as large around as a broom handle and more than half as long. Two teeth on either jaw analagous to the canine teeth were arranged like a pair of shears for cutting, and were as sharp on the edges as a knife. The internal structure was quite similar in a general way to a hog's. The hippopotamus weighed a trifle over thirty-six hundred pounds, and the hide, at a conservative estimate, would weigh four hundred pounds, and was an inch and a half thick in some places.

Shortly after their arrival last year in winter quarters we held a post-mortem on a dromedary, which had died suddenly, having shown no symptoms of any disease before its death. A careful post-mortem revealed the fact that at one time the animal had swallowed a handful of nails, one of which had penetrated the walls of the rumen and penetrated the diaphragm, setting up an enormous abscess at the point. This had broken and filled the abdomen with pus, serum, etc., and speedily caused the animal's death. The visceral structure of this animal did not differ materially from any ruminant with the exception of the paunch. The mucous membrane of this paunch, or so-called "first stomach," had in it at frequent intervals small pocket-like sacs, covered by a very thin flap. These little pockets were filled with water. This arrangement enables the camel and dromedary to exist for long intervals without taking any water,

thus making them such valuable beasts of burden on the sandy deserts of their native country. The feet were especially well adapted for travel on a sandy soil. Instead of having claws, as with oxen, the sole of the foot consisted of an enormous fleshy pad, almost as round and large as a dinner plate. Another dromedary was a patient in the hospital for nearly two months, having undergone an operation for a bowel fistula. As the case was of several years' standing we were unable to effect a cure. The animal was very old of little value, and was finally destroyed at the request of the Sells Bros.

Of all the operations performed at the hospital this was in many respects the most remarkable. It was found impossible to chloroform the patient, as she could close the nostrils at will and breath through the mouth. Trouble was anticipated in casting and securing for operation, as the kicking power reached its maximum in the long-legged dromedary. On being led onto the mat, however, the animal laid down of its own accord, making no resistance to being secured. At the beginning of the operation she made a few vigorous protests, but soon gave up, and throughout the entire operation kept chewing its cud as though nothing out of the ordinary was going on.

Earlier in the year an encysted tumor was removed from the neck of a young dromedary. This operation was quite difficult, as it had grown fast to the jugular vein, and the continuous bellowing of the animal made it almost impossible to prevent severing the jugular vein, as the violent inhalation and exhalation kept the parts in constant motion. The operation was perfectly successful, not the slightest scar being left on the thick skin.

Among the cases treated this year were a zebra and a monkey. The

zebra was treated for heaves, the same treatment being given that would have been prescribed in any heavy horse. The monkey was a patient at the hospital and was treated for a fracture of the left tibia. The injury was caused by a too intimate friendship of the monkey's for the above mentioned zebra. The fracture was a simple one and was set and a plaster cast applied, the patient making a rapid recovery. Needless to say, perhaps, that this last patient was the most entertaining of any we have ever treated. The knowledge of comparative anatomy afforded by these cases is considerable, and embraces animals from every climate and country, and exceeds by far any knowledge obtained from books. The opportunity for this study is highly appreciated by all students of the veterinary department.

#### Valuable Publications.

Especial attention is called to the quarterly publications of the Columbus Horticultural Society. This society is one of the oldest organizations of the kind in this country, and its publications are often cited as authority by the foremost writers of the day. The publications consist of the *Quarterly Journal of Proceedings*, and the *Annual Report of the Society*. The papers read before the society at its regular monthly meetings are presented, together with the reports of committees on different branches of Horticulture and the Natural Sciences. The *Journal of the Columbus Horticultural Society*, and the *Annual Report* may be obtained for one year by sending the subscription price, 50 cents, to John F. Cunningham, Secretary, Horticultural Hall, Ohio State University, Columbus.

#### Finance.

Nothing has occurred during the month of February calculated to disturb or in any way weaken the feeling of confidence that has for some time been dominating business operations. The leading authorities are



agreed that the situation has not lost anything of its favorable character since the beginning of the year, but that it has continued to gain steadily in strength, and furthermore that the signs still point to the making of new records in 1899. Trade reports from nearly every section of the country have been of a most encouraging nature, and reflect a hopeful sentiment as to the future on the part of commercial and manufacturing interests.

February is usually looked forward to by business men as a month when dullness is to be expected, and as a rule it is one of the quietest months of the year. The business of the past month was far the greatest ever known in February. And besides a number of things conspired to make the bank clearings showing for February a less notable one than was that of January or of December of last year. It should not be gathered from this, however, that comparison with the month of February in previous years is at all an unsatisfactory one, though the weather conditions in a large part of the country during the month certainly worked toward reduced trade, and consequently smaller bank operations. The influence of two holidays reducing the number of business days during the month to twenty-two, as compared with twenty-five in January, should also not be lost sight of in any comparison which includes two months, and the practical subsidence of the great speculative wave in securities and staples generally, was also a feature tending to reduce clearings from the immense totals of January and December.

The total clearings at seventy-nine cities for the month of February aggregated \$6,961,828,268, an increase of 25.7 per cent. over the corresponding month a year ago, but a decrease from the month of Janu-

ary of 17.8 per cent., and a falling off from the month of December, 1898, of 5 per cent.

There were no adventurous circumstances or unusual conditions calculated to swell the clearings last month. The speculative movement on the stock and grain boards was at low ebb, as compared with the two or three preceding months. The month was almost entirely devoid of extraordinary conditions, and it seems perfectly safe, therefore, to ascribe the gain which is shown to a healthy and legitimate growth of trade in all directions.

Still another indication of increased activity all along the line is the larger demand for money that has lately been noted. And the particularly favorable point in regard to this demand is that it is diversified. There is better inquiry for loans in most of the market centers, but it consists so largely of applications in which industrial securities are the collateral that great discretion must be exercised in conservative financial circles, but discrimination against these stocks is not carried to the point of rejecting loans. The course of the money market is toward higher rates, which will likely prevail during the rest of this month, but charges for the use of money can not remain permanently higher on account of the great plethora of loanable funds in the country under the present prosperous conditions.

Commercial and railroad reports coming to hand during the past month all testify to steady progress that is being made on every hand. True, in some cases the increases in railroad earnings do not come up to those reported during the last few months, but there is nothing surprising at all in that. It is hardly to be expected that the business of the railroads should be as heavy in mid-winter as when the grain carrying



movements is at its height. In view of the extraordinary increases in earnings shown last year as compared with the preceding year, it is certainly encouraging that any gains at all should be recorded this year.

The stock market is fundamentally strong and reasonably active with the speculative excitement of the first of the new year largely abated, and bearing marks of the approach of influences that may before long subject the present scale of values to a sharp trial. External conditions affecting prices remain quite as favorable as they have been, but opinion is becoming more general that these conditions do not legitimately warrant any further uniform advance in prices. And it seems reasonably safe to expect that any reaction can not run to any serious lengths. An opportunity for investment in stocks upon merit will be offered, and a firmer basis will be given to the new situation than existed before.

An enlarged volume of spring trade, particularly in dry goods, due to spring weather, special strength in the demand and price for cotton fabrics, an immense and urgent call at soaring prices for iron and steel and all its products, and substantial advances in wages, chiefly affecting the above mentioned industries and benefiting at a conservative calculation 110,000 operatives, are among features of the month, going to show that the producing elements of the country's population are sharing in the present favorable conditions. From many cities, east and west, come reports of an active demand from the jobbers for spring dry goods. From the cotton manufacturing industry of the east comes reports of activity, inducing manufacturers to grant advances to their operatives, while the list of advances in prices of iron and steel products, whether of crude, of manufactured,

or even of old material, is a virtual roll-call of that industry's products. An encouraging feature is the small number of strikes for higher wages reported, partly owing to advances being already conceded as a result of sliding-scale agreements, the only important labor troubles being reported in the coal mining industry in the southwest. Additional proof that the export demand for our iron and steel manufactures will be checked by recent and pending price advances is not lacking. In the lumber trade the producer seems likely also to reap a long-delayed reward as buyers become familiar with the fact that available supplies whether of hardwood, of white or yellow pine, or of spruce and hemlock, are well controlled, while the outlook for building trade activity is favorable. Our export trade in cereals is recovering from the check administered by recent frigid and stormy weather, but reports of damage to the winter wheat crop on the one hand and estimates of superabundant supplies of old crop in farmers' hands have about balanced each other, with a slight advantage as regards prices secured by the bears.

Broadly speaking, the situation is a strong one, and conditions are all that could reasonably be desired. The prevailing sentiment is optimistic. The commercial outlook in this country has probably never before been so clear as it is at present, and extensive preparations are, therefore, being made to take full advantage of the opportunities that are offered.

#### BOOK REVIEWS.

THE HESSIAN FLY IN THE UNITED STATES: Herbert Osborn; Bulletin No. 16, U. S. Department of Agriculture; Division of Entomology.

We were lately presented by the author with a copy of the above

named bulletin. Professor Osborn deserves the thanks of the agriculturists of the country for the attractive form and clear style of this publication.

After a historical statement concerning this pest in the United States the life history and description of the insect are given. Then follow its development, food plants, natural enemies, remedies and a full bibliography.

The work is well illustrated with clear cut drawings, and the descriptions are quite complete. All students of entomology and all others who may be interested should see at once that they possess this bulletin.

---

**FERTILIZERS:** Edward B. Voorhees; cloth; pp. 335; The Macmillan Company, New York; \$1.

The benefits to be derived from the use of commercial fertilizers is not much questioned nowadays by those who have tried them. From the preface we quote the author's aim in writing this book, as follows: "It has been the aim of the author to point out the underlying principles and to discuss, in the light of our present knowledge of the subject, some of the important problems connected with the use of fertilizer materials."

Beginning with a discussion of soils and soil fertility, the author discusses the natural losses of fertility and the influences that govern the same. Artificial losses are also discussed and comparisons of the prices received for the fertility elements in the different crops are made.

"The Function of Manures and Fertilizers" is made the subject of the second chapter, and this chapter embraces a description of the essential elements of fertilizers, the direct and indirect effect of manures, and the uses of fertilizers.

From the third to the ninth chapters the greater part of the text concerns special kinds of artificial manures. At the end of chapter seven, a number of valuable formulas for fertilizer mixing are given.

The remainder of the book is devoted to fertilizers for special crops, and to the description and results of experiments that have been made.

In all his statements the author is clear and commonplace. It is a work which, while considering the deepest subjects, presents them in a way which will be understood by the practical man as well as the student. A good book for the practical farmer.

---

#### Seed Catalogues Received.

**PETER HENDERSON'S** (New York) **MANUAL OF EVERYTHING FOR THE GARDEN**; a 190-page pamphlet, bound in colors, and illustrated with several colored plates.

It is profusely illustrated in black and white and is a study in varieties. We have also received the wholesale catalogue from this firm.

---

**JOHNSON & STOKES'** (Philadelphia) **GARDEN AND FARM MANUAL**.

A 96-page book, but full of good things from cover to cover. The design on the front cover is especially attractive in relief. Illustrates many new and old varieties of garden, farm and flower seeds and bulbs.

---

**STORRS' & HARRISON COMPANY** (Painesville) **SPRING CATALOGUE**.

This well known Ohio firm sends us their catalogue in its usual good form, bound in colors, 170 pages. It is indexed, and is well illustrated in black and white. Complete lists of garden, flower and grain seeds and bulbs are given.

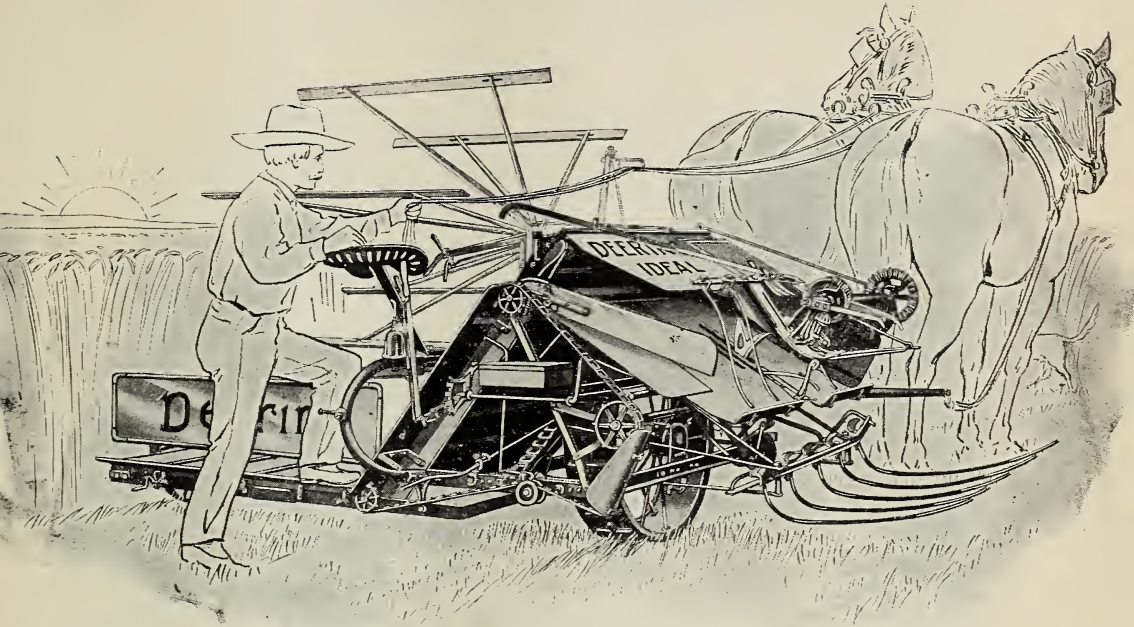


ADVERTISEMENTS.

# Deering Ideal Binder

THE GRANDEST MACHINE IN THE LAND.

Genuine and Original Deering Roller and Ball Bearings Throughout.



THE LIGHT-DRAFT, NOISELESS-RUNNING DEERING IDEAL BINDER.

Perfectly finished, with all the best binder features. Adapted to any crop, heavy or light, thick or thin. Just the machine every farmer needs.



Ideal Binders,      Ideal Mowers,  
Ideal Reapers,      Corn Binders,  
Hay Rakes,  
Binder Twine and Harvester Oil

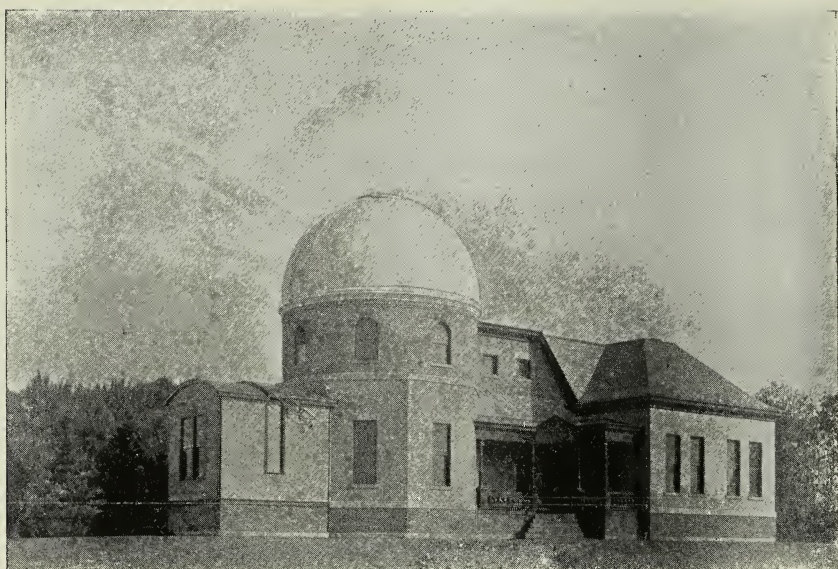
**Deering Harvester Co.**

CHICAGO, U. S. A.

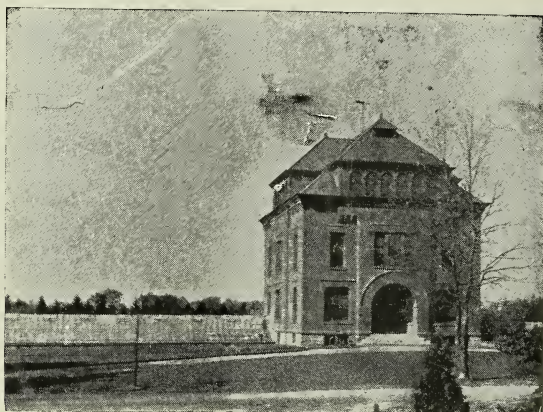




VETERINARY HOSPITAL.



ASTRONOMICAL OBSERVATORY.



HORTICULTURAL HALL.

OHIO STATE UNIVERSITY.